

SEQUENCE LISTING

<110> Krieg, Arthur M.
Kline, Joel N.
Klinman, Dennis
Steinberg, Alfred D.

<120> Immunostimulatory Nucleic Acid Molecules

<130> C01039.70075.US

<150> US 08/276,358
<151> 1994-07-15

<150> US 08/386,063
<151> 1995-02-07

<150> US 08/738,652
<151> 1996-10-30

<150> US 09/818,918
<151> 2001-03-27

<160> 56

<170> FastSEQ for Windows Version 3.0

<210> 1
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 1
atggaaggtc cagtgttctc 20

<210> 2
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 2
atcgacctac gtgcgttctc 20

<210> 3
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

| | |
|---|----|
| <pre> <400> 3 tccataacgt tcctgatgct </pre> | 20 |
| <pre> <210> 4 <211> 15 <212> DNA <213> Artificial Sequence </pre> | |
| <pre> <220> <223> Synthetic oligonucleotide </pre> | |
| <pre> <400> 4 gcttagatgtt agcgt </pre> | 15 |
| <pre> <210> 5 <211> 19 <212> DNA <213> Artificial Sequence </pre> | |
| <pre> <220> <223> Synthetic oligonucleotide </pre> | |
| <pre> <400> 5 gagaacgtcg accttcgat </pre> | 19 |
| <pre> <210> 6 <211> 15 <212> DNA <213> Artificial Sequence </pre> | |
| <pre> <220> <223> Synthetic oligonucleotide </pre> | |
| <pre> <400> 6 gcatgacgtt gagct </pre> | 15 |
| <pre> <210> 7 <211> 20 <212> DNA <213> Artificial Sequence </pre> | |
| <pre> <220> <223> Synthetic oligonucleotide </pre> | |
| <pre> <400> 7 tccatgacgt tcctgatgct </pre> | 20 |
| <pre> <210> 8 <211> 20 <212> DNA <213> Artificial Sequence </pre> | |
| <pre> <220> <223> Synthetic oligonucleotide </pre> | |
| <pre> <400> 8 tccatgagct tcctgagtct </pre> | 20 |
| <pre> <210> 9 </pre> | |

```

<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 9
tccaaagacgt tcctgatgct 20

<210> 10
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 10
tccatgacgt tcctgacgtt 20

<210> 11
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 11
tccatgagct tcctgagtgc t 21

<210> 12
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 12
ggggtcaacg ttgagggggg 20

<210> 13
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 13
gctagacgtt agcgt 15

<210> 14
<211> 15
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Synthetic oligonucleotide

<221> modified_base
<222> (7)...(7)
<223> m5c

<400> 14
gctagacgtt agcg 15

<210> 15
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<221> modified_base
<222> (7)...(7)
<223> m5c

<221> modified_base
<222> (13)...(13)
<223> m5c

<400> 15
gctagacgtt agcg 15

<210> 16
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 16
gcatgacgtt gagct 15

<210> 17
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 17
atggaaggtc cagcgttctc 20

<210> 18
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

```

```

<400> 18
atcgactctc gagcgttctc 20

<210> 19
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<221> modified_base
<222> (3)...(3)
<223> m5c

<221> modified_base
<222> (10)...(10)
<223> m5c

<221> modified_base
<222> (14)...(14)
<223> m5c

<400> 19
atcgactctc gagcgttctc 20

<210> 20
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<221> modified_base
<222> (3)...(3)
<223> m5c

<400> 20
atcgactctc gagcgttctc 20

<210> 21
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<221> modified_base
<222> (18)...(18)
<223> m5c

<400> 21
atcgactctc gagcgttctc 20

<210> 22
<211> 20
<212> DNA

```

```

<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 22
atggaaggtc caacgttctc                                20

<210> 23
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 23
gagaacgctg gaccttccat                                20

<210> 24
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 24
gagaacgctc gaccttccat                                20

<210> 25
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 25
gagaacgctc gaccattcgat                                20

<210> 26
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 26
gagcaagctg gaccttccat                                20

<210> 27
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

```

| | | |
|---------------------------------|----|--|
| <221> modified_base | | |
| <222> (6)...(6) | | |
| <223> m5c | | |
| | | |
| <400> 27 | | |
| gagaacgctg gaccttccat | 20 | |
| | | |
| <210> 28 | | |
| <211> 20 | | |
| <212> DNA | | |
| <213> Artificial Sequence | | |
| | | |
| <220> | | |
| <223> Synthetic oligonucleotide | | |
| | | |
| <221> modified_base | | |
| <222> (14)...(14) | | |
| <223> m5c | | |
| | | |
| <400> 28 | | |
| gagaacgctg gaccttccat | 20 | |
| | | |
| <210> 29 | | |
| <211> 20 | | |
| <212> DNA | | |
| <213> Artificial Sequence | | |
| | | |
| <220> | | |
| <223> Synthetic oligonucleotide | | |
| | | |
| <400> 29 | | |
| gagaacgatg gaccttccat | 20 | |
| | | |
| <210> 30 | | |
| <211> 20 | | |
| <212> DNA | | |
| <213> Artificial Sequence | | |
| | | |
| <220> | | |
| <223> Synthetic oligonucleotide | | |
| | | |
| <400> 30 | | |
| gagaacgctc cagcaactgat | 20 | |
| | | |
| <210> 31 | | |
| <211> 20 | | |
| <212> DNA | | |
| <213> Artificial Sequence | | |
| | | |
| <220> | | |
| <223> Synthetic oligonucleotide | | |
| | | |
| <400> 31 | | |
| tccatgtcgg tcctgatgct | 20 | |
| | | |
| <210> 32 | | |
| <211> 20 | | |
| <212> DNA | | |

```

<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 32
tccatgtcg  tcctgatgct 20

<210> 33
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<221> modified_base
<222> (8)...(8)
<223> m5c

<400> 33
tccatgtcg  tcctgatgct 20

<210> 34
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<221> modified_base
<222> (12)...(12)
<223> m5c

<400> 34
tccatgtcg  tcctgatgct 20

<210> 35
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 35
tccatgacgt  tcctgatgct 20

<210> 36
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 36
tccatgtcg  tcctgctgat 20

```

| | |
|---------------------------------|----|
| <210> 37 | |
| <211> 20 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| | |
| <220> | |
| <223> Synthetic oligonucleotide | |
| | |
| <400> 37 | |
| tccatgtcgg tcctgatgct | 20 |
| | |
| <210> 38 | |
| <211> 20 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| | |
| <220> | |
| <223> Synthetic oligonucleotide | |
| | |
| <400> 38 | |
| tccatgcgg tcctgatgct | 20 |
| | |
| <210> 39 | |
| <211> 20 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| | |
| <220> | |
| <223> Synthetic oligonucleotide | |
| | |
| <400> 39 | |
| tccatggcgg tcctgatgct | 20 |
| | |
| <210> 40 | |
| <211> 20 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| | |
| <220> | |
| <223> Synthetic oligonucleotide | |
| | |
| <400> 40 | |
| tccatgacgg tcctgatgct | 20 |
| | |
| <210> 41 | |
| <211> 20 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| | |
| <220> | |
| <223> Synthetic oligonucleotide | |
| | |
| <400> 41 | |
| tccatgtcga tcctgatgct | 20 |
| | |
| <210> 42 | |
| <211> 20 | |
| <212> DNA | |

```

<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 42
tccatgtcgc tcctgatgct                                20

<210> 43
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 43
tccatgtcgt tcctgatgct                                20

<210> 44
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 44
tccatgacgt tcctgatgct                                20

<210> 45
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 45
tccataacgt tcctgatgct                                20

<210> 46
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 46
tccatgacgt ccctgatgct                                20

<210> 47
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

```

| | |
|--|----|
| <pre> <400> 47 tccatcacgt gcctgatgct </pre> | 20 |
| <pre> <210> 48 <211> 15 <212> DNA <213> Artificial Sequence </pre> | |
| <pre> <220> <223> Synthetic oligonucleotide </pre> | |
| <pre> <400> 48 gcatgacgtt gagct </pre> | 15 |
| <pre> <210> 49 <211> 15 <212> DNA <213> Artificial Sequence </pre> | |
| <pre> <220> <223> Synthetic oligonucleotide </pre> | |
| <pre> <400> 49 gctagatgtt agcgt </pre> | 15 |
| <pre> <210> 50 <211> 20 <212> DNA <213> Artificial Sequence </pre> | |
| <pre> <220> <223> Synthetic oligonucleotide </pre> | |
| <pre> <400> 50 ggggtaaagt ctgagggggg </pre> | 20 |
| <pre> <210> 51 <211> 15 <212> DNA <213> Artificial Sequence </pre> | |
| <pre> <220> <223> Synthetic oligonucleotide </pre> | |
| <pre> <400> 51 gctagacgtt agtgt </pre> | 15 |
| <pre> <210> 52 <211> 15 <212> DNA <213> Artificial Sequence </pre> | |
| <pre> <220> <223> Synthetic oligonucleotide </pre> | |
| <pre> <221> modified_base <222> (8)...(8) <223> m5C </pre> | |

| | |
|--|----|
| <pre> <400> 52 gctagacctt agtgt <210> 53 <211> 20 <212> DNA <213> Artificial Sequence <220> <223> Synthetic oligonucleotide <221> modified_base <222> (8) . . . (8) <223> m5c <400> 53 tccatgtcggt tcctgatgct </pre> | 15 |
| <pre> <210> 54 <211> 20 <212> DNA <213> Artificial Sequence <220> <223> Synthetic oligonucleotide <400> 54 tccatgacgt tcctgatgct </pre> | 20 |
| <pre> <210> 55 <211> 18 <212> DNA <213> Artificial Sequence <220> <223> Synthetic oligonucleotide <400> 55 tctcccagcg tgcgccat </pre> | 20 |
| <pre> <210> 56 <211> 18 <212> DNA <213> Artificial Sequence <220> <223> Synthetic oligonucleotide <400> 56 catttccacg atttccca </pre> | 18 |